De-Risking Investments in Alaskan Aquatic Farming through Validated Regional Ocean and Wave Simulations Integrated with Model-Based Engineering and Techno-Economic Analysis

Industry Update–September 2025. For **Alaska Fisheries Development Foundation.**

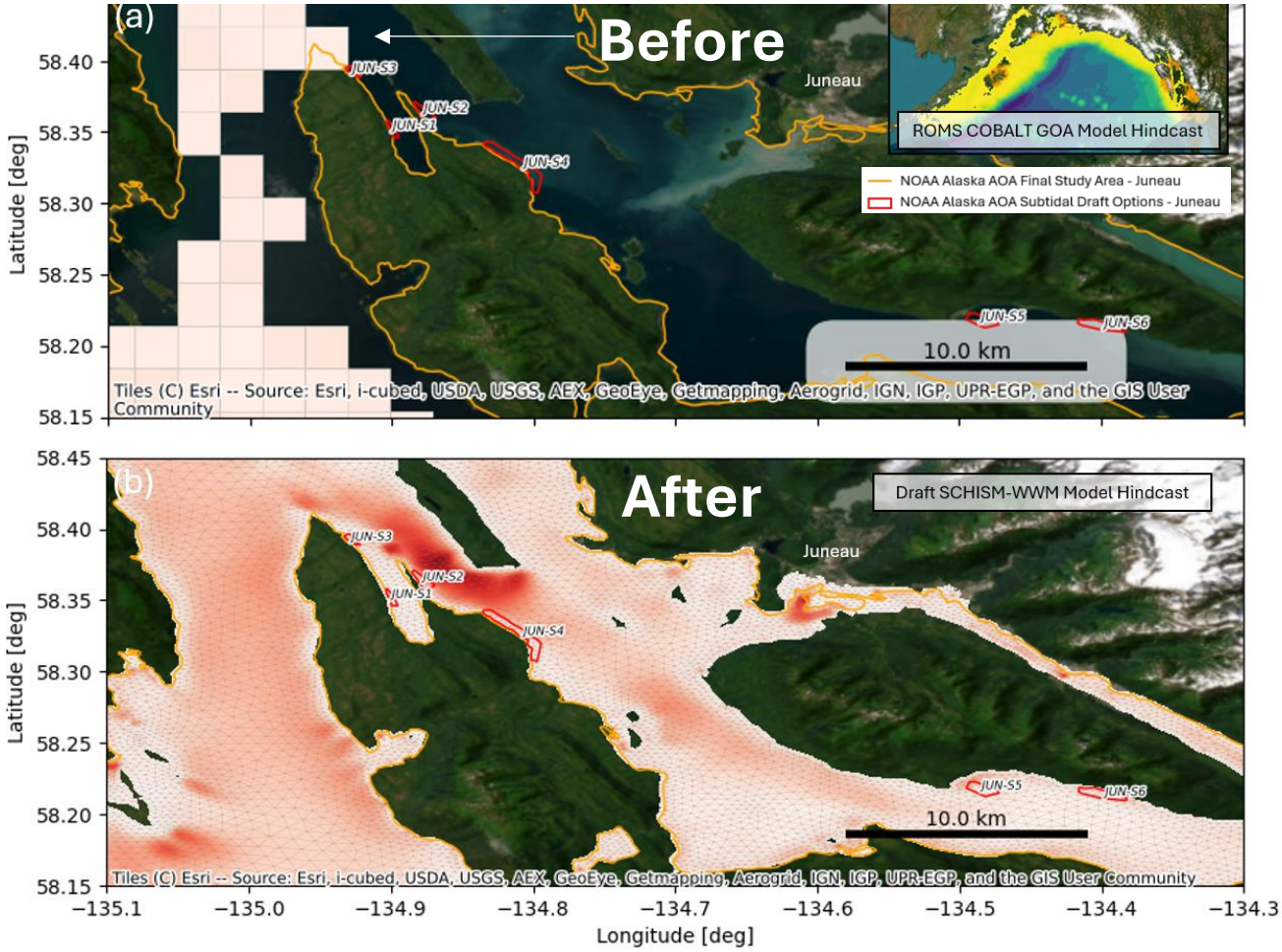
WHAT? Kelson Marine and collaborators are de-risking investments in the Alaskan Mariculture industry by (1) characterizing operational and extreme environmental conditions in the data-sparse Gulf of Alaska and (2) specifying representative farm designs and associated cost of production for cultivated seaweed and oysters.

WHY? Alaska presently lacks data on typical and extreme wind, current, wave, and ocean biogeochemistry at length and time scales needed by the Alaskan mariculture industry in coastal waters. This is hindering quality site selection and reliable gear right-sizing and slowing the growth of safe, profitable mariculture in the state.

HOW? Funded by Alaska Fisheries Development Foundation, Kelson Marine is creating new resources for the Alaskan mariculture industry's site selection and farm design process by applying validated ocean-wave (regional to coastal scale), hydro-/structural-dynamic (farm scale), and technoeconomic analysis (TEA) modeling methods to create:

1. Maps and datasets of environmental factors affecting mariculture, including (a) typical and extreme near-surface currents, water levels, wind, wave environments and (b) representative monthly temperature, salinity, turbidity, photosynthetically available radiation, and chlorophyll-a, all down to the sub-estuary/fjord scale.
2. Component specifications for selected sites through validated hydro-/structural dynamic model-based engineering of select oyster and seaweed cultivation structures.
3. Maps of estimated cost-of-production for seaweed and oysters through TEA as a function of site characteristics.

WHEN? Reports and web maps will be publicly available by September 2026, providing actionable intelligence to safely accelerate the growth of Alaska's mariculture industry.



Top: Existing current speed data (intended for regional-scale dynamics). Bottom: Data being generated by Kelson Marine in the present project. Close-up of Juneau, AK with NOAA Alaska draft AOAs.

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